

MEMORANDUM

To: Staff Work Group on Urban Water Use Measurement
From: Eric Poncelet and Bennett Brooks (CONCUR, Inc.)
Date: October 9, 2003
Re: Draft Definition of Appropriate Urban Water Use Measurement
cc: Tom Gohring (Assistant Deputy Director, Water Management, California Bay-Delta Authority), David Mitchell (M.Cubed), Lee Axelrad (Resources Law Group)

Introduction and background

Please find attached a “strawman”revised draft definition of appropriate urban water use measurement. This document constitutes the California Bay-Delta Authority’s (Authority) preliminary-current proposed definition on this topic. It is again being submitted to the Urban Water Use Measurement Staff Work Group for review and discussion.

This document contains revisions, shown in underline/strike-through format, deriving from: 1) Staff Work Group comments at its September 17, 2003 meeting, 2) follow-up Work Group member suggestions submitted by e-mail, and 3) further CBDA staff and consultants deliberations on this topic. [Note: this document does not presently contain the revisions proposed by Ed Osann regarding landscaping and multi-family housing water use measurement. The Work Group will address these issues separately.]

The impetus for addressing this topic stems from longstanding stakeholder concerns over the need for more complete and accurate measurement of urban and agricultural water deliveries. Recognizing this, the CALFED Bay-Delta Program’s August 2000 Record of Decision (ROD) called for the Water Use Efficiency (WUE) Program to produce a definition of what it termed “appropriate” measurement of urban water use.

Structure/outline of document

The attached proposed definition of appropriate urban water use measurement is structured as follows:

- I. State standards and protocols for recording and reporting urban water use
- II. Measurement of urban water uses
 - A. Urban water purveyor water sources and production
 - B. Urban water purveyor customer water uses
 - C. Urban wastewater discharger wastewater collection and discharge
 - D. Net groundwater uses
- III. Reporting of urban water uses
 - A. Urban water purveyor reporting to State of California
 - B. Urban wastewater discharger reporting to State of California
- IV. Urban water use research program

Each of these sections and sub-sections begins by defining the Authority's current thinking on what constitutes an appropriate level, amount, or reporting of urban water use measurement. This is followed by discussion of: 1) the justifications for the proposed definition, 2) expected impacts (mostly cost-related), and 3) follow-on considerations.

Guiding perspective and considerations

The perspective by which Authority staff and consultants have approached the task of defining "appropriate" urban water use measurement has been guided in large part by the following question: What level, form, and/or process of urban water use measurement is necessary to better achieve state and federal water management objectives related to planning, allocation, transfer, and water use efficiency?

Authority staff and consultants also based their proposed definition of appropriate measurement of urban water use on the following additional key considerations:

- Declared policy of state of CA
- Industry practice and standards
- Empirical evidence demonstrating the efficacy of the proposed measurement definition
- Assessment of need (based upon meetings and interviews with experts in the field as well as background research)
- Prioritization of flow information over water quality information¹
- Practical and achievable steps capable of yielding meaningful benefits to state water management objectives:
- Need for an adaptive management approach

Process approach

To inform this proposed definition, Authority staff and consultants have drawn upon the expertise and advice of broad stakeholder and technical expert communities as follows:

- In the summer and fall of 2002, the Authority conducted stakeholder interviews with 25 individuals representing a cross-section of water suppliers, environmental organizations, CALFED agencies and partners, business groups, citizen groups, and consultants.
- In the spring of 2003, the Authority convened a multi-stakeholder Staff Work Group on Urban Water Use Measurement. From March through May, the Work Group held two in-person meetings and several teleconferences intended to better define the state of urban water use measurement in California, including current practices, possible changes, and potential barriers to new approaches.
- In June-July, 2003, Authority consultants convened a meeting among urban water use technical and policy experts to better establish the specific information

¹ The decision to prioritize flow information over water quality information arose out of consultations with representatives of DWR, DHS, and SWRCB. It is assumed that water quality measurement and reporting are currently adequately handled.

needs driving considerations of urban water use measurement. Authority consultants then conducted a series of targeted follow-up interviews to provide additional clarity from the perspective of state urban water managers and planners (see Attachment 1 for a list of the meeting attendees and the individuals interviewed).

Anticipated next steps

The Authority intends to take the following next steps to develop an implementation approach to urban water use measurement:

- *Finalize proposed definition of appropriate urban water use measurement.* The Authority will convene an Urban Water Use Measurement Staff Work Group to review and comment on the proposed definition. The intent of this meeting, to be held on September 17, 2003, will be to elicit stakeholder views on the draft definition that the Assistant Deputy Director for Water Management can then use to prepare a final definition. This will be an in-person meeting to take place in Sacramento.
- *Draft implementation plan.* Following confirmation of the proposed definition, the Work Group will identify and recommend options for implementing appropriate urban water use measurement requirements that are fair, practical, and broadly supportable. If possible, the Work Group will begin this effort during the September 17, 2003 meeting. The Work Group is expected to meet through November 2003.
- *Conduct broader Authority and public reviews.* Once the proposed definition and implementation plan are drafted, these documents will be submitted for review by and discussion with Authority advisory and decision-making bodies, as well as the public. Final revisions will be made at that time. It is possible that this step will incorporate an approach to agricultural water use measurement that is being developed on a parallel track.
- *Initiate legislative discussions.* Once approved, the WUE Program will work with implementing agencies and state policymakers, as necessary, to put forward an implementation approach. It is uncertain at this point whether a final recommended implementation package would necessitate legislative change, administrative changes, or both. Again, it is possible that this step will incorporate an approach to agricultural water use measurement that is being developed through a separate process.

We look forward to your input on this process.

~~“Strawman”~~ Draft Definition **Appropriate Urban Water Use Measurement**

Definition of Terms

Water Meter - includes any suitable water measuring device or facility that measures or determines the volumetric flow of water.²

Water Service - means the sale, lease, rental, furnishing, or delivery of water for beneficial use, and includes, but is not limited to, contracting for the sale, lease, rental, furnishing, or delivery of water, except bottled water.³

Water Purveyor - means any person who furnishes water service to another person.⁴

Urban Water Purveyor – means a water purveyor that provides water service for domestic, municipal, or industrial uses.⁵

Urban Wastewater Discharger – means any ~~publicly owned treatment works (POTW) or point source~~ discharger subject to an NPDES permit or Waste Discharge Requirement ~~permitting as defined by the federal Clean Water Act and state Porter-Cologne Act.~~

NPDES Permit – is a federal permit governing discharge of wastewater to surface waters authorized by the federal Clean Water Act. (In California, authority to issue NPDES permits has been delegated to the State Water Resources Control Board.)

Waste Discharge Requirements – is the state “permit” governing the discharge of wastewater to surface or groundwater in California authorized by the state Porter-Cologne Water Quality Control Act equivalent of the term “NPDES permits” - (as used in the Clean Water Act) when they cover surface point sources. ⁶ (For surface water discharges, the State Water Resources Control Board/Regional Water Quality Control Boards issues a combined NPDES permit and WDR; for ground water, only a WDR is issued.)

Reclamation Requirements – is the state “permit” governing wastewater reclamation activities in California issued by the Regional Water Quality Control Boards in lieu of a WDR.

² Cal. Water Code, § 516.

³ Cal. Water Code, § 515.

⁴ Cal. Water Code, § 512. “Person” means any individual, firm, association, partnership, corporation, or public entity of any kind.” Cal. Water Code, § 513. “Public entity” includes a city, county, city and county, whether general law or chartered, a district, board, commission, bureau, authority, agency, department, division, section, any other political subdivision of the state of any kind, or the state.” Cal. Water Code, § 514.

⁵ As such, “Urban Water Purveyors” are not confined to urban areas.

⁶ Cal. Water Code, § 13374.

Definition of Appropriate Measurement for Urban Water Systems

I. State Standards and Protocols for Recording and Reporting Urban Water Use

Appropriate measurement of urban water uses requires the state to develop the following:

- a) Data collection guidelines and protocols for urban water purveyors and wastewater dischargers. At a minimum, the guidelines and protocols need to address (1) estimation of service area population; (2) classification of water supply source measurement data; (3) classification of customer water use measurement data; and (4) classification of wastewater source and disposal measurement data.
- b) Systems for water purveyors and wastewater dischargers to report urban water use data annually to the state.
- c) Systems to disseminate urban water use data to local, regional, state, and federal water planning and management agencies and authorities; water purveyors and customers; research institutions and universities; general public.
- d) Guidelines for ensuring the accuracy of the measurement data.

Justification of Definition:

1. Most urban water and wastewater purveyors in California currently collect vast amounts of data to manage their own systems. This data is not readily obtainable, comparable, or understandable by water managers outside of these utilities. There is a generally recognized need to develop data collection standards and protocols—i.e., determine what kinds of data need to be collected, how this will be done and how this information will be transmitted to others, and measures for QA/QC. Standardizing to some degree how urban water purveyors compile and provide data to state and federal water planners is an essential step in achieving the state's overarching policy objective of determining and communicating the quantities of water in use throughout the state to the maximum extent reasonable.⁷ The absence of standards for urban water use data collection and reporting greatly diminishes the value of this data for regional and statewide planning and water resource management.

Expected Impacts:

1. The state would incur costs to develop state water data collection guidelines and protocols; provide technical assistance to water and wastewater purveyors implementing the guidelines and protocols; administering data collection processes; and enforcing adoption of any standards. Federal funds for

⁷ Cal. Water Code, § 520. The California State Legislature has declared that, "pursuant to the primary interest of the people of the state to put the limited available supplies of water in this state to beneficial use to the fullest extent of which they are capable, and to prevent waste, unreasonable use, or unreasonable method of use, it is necessary to determine the quantities of water in use throughout the state to the maximum extent that is reasonable to do so."

developing a statewide reporting system for wastewater discharges subject to NPDES ~~and WDR~~ permitting requirements have already been committed. A statewide system for NPDES ~~and WDR~~ reporting is projected to be operational in ~~2004 or~~ 2005.⁸

2. Some, possibly most, urban water purveyors and wastewater dischargers would incur costs to conform their data collection and reporting systems to the guidelines and protocols. ~~Recycled water providers are already subject to reporting requirements per State Water Code sections 13522 and 13523. Additional costs for reporting for recycled water providers would likely be negligible.~~
3. The State as well as urban water purveyors might incur potential cost benefits if the standards and protocols developed enable combination of the multiple existing planning and reporting processes (e.g., DWR, DHS, USBR, CUWCC).

Follow-on Considerations:

1. Producing these guidelines/protocols will require collaboration of state level water managers, local water managers and academics and coordination with data collection agencies (e.g., DWR, ~~SWRCB, CPUC~~, DHS, CUWCC). How should such a process be implemented? What is a realistic timeline for such a process? How would it be funded?
2. Should conformance to the guidelines/protocols be enforceable? If so, what enforcement mechanisms would be appropriate?
3. If it is infeasible to get urban water purveyors and wastewater ~~purveyors~~ dischargers to abide by new data collection standards and protocols, should protocols be established for documenting the information that they collect so as to make it more transparent to those using it for regional or state planning and research? Should urban water purveyors and wastewater dischargers be required to develop conversion factors to enable converting data from their own systems to a State-developed standard system?
4. What type of QA/QC is necessary to support these standards and protocols to assure that the data coming in is reasonably accurate?
5. Who would pay for urban water purveyors and wastewater dischargers to conform their data collection and reporting systems to the guidelines and protocols?
6. How should the development of these guidelines/protocols be integrated with ongoing efforts to combine existing planning and data reporting processes (e.g., DWR, DHS, USBR, CUWCC)?

⁸ Personal Communication with State Water Resources Control Board; Personal Communication with Environmental Protection Agency, Region 9.

7. What type of database will be best suited to assuring accessibility and dissemination of the data?

II. Measurement of Urban Water Uses

A. Urban water purveyor water sources and production

Appropriate measurement of urban water purveyor water sources and production requires the following:*

- a) Use of suitable water meters at all water source and production points, including source water intakes, treatment works, and storage reservoir outlets. Source water includes surface water, groundwater, and potable recycled water. A suitable water meter is one that is in compliance with relevant standards of the American Water Works Association and any relevant state standards and legal requirements. ~~is of a type approved by the Director of Food and Agriculture pursuant to Section 12500.5 of the Business and Professions Code.~~
- b) Source and production meters ~~should to~~ be read at least once each month.
- c) Source and production meters ~~should to~~ be sized appropriately, well maintained, and periodically calibrated to ensure reasonable accuracy.
- d) Source and production measurement data ~~should to~~ be recorded using standard measurement units and stored by the urban water purveyor using a suitable database management system. Data structures and classification schemes should conform to relevant state water data collection guidelines and protocols (see Section I).

* Nothing in this definition should be construed to supercede existing state and federal authority and requirements embodied in or through the federal Safe Drinking Water Act and the California Safe Drinking Water Act to impose measurement, monitoring, and reporting requirements on water quality subject to regulation under these acts.

Justification of Definition:

1. The California State Legislature has declared that, “pursuant to the primary interest of the people of the state to put the limited available supplies of water in this state to beneficial use to the fullest extent of which they are capable, and to prevent waste, unreasonable use, or unreasonable method of use, it is necessary to determine the quantities of water in use throughout the state to the maximum extent that is reasonable to do so.”⁹ Volumetric measurement of urban water purveyor water sources and production is a necessary and reasonable action to determine the quantities of water in use by urban areas in California.
2. The California Public Utilities Commission (CPUC or Commission), pursuant to General Order 103, requires water systems within its jurisdiction to install a suitable measuring device, or otherwise determine production, at each source of supply in order that a record may be maintained of the quantity of water produced by each source. It further requires that at least once each month, the quantity produced from each source of supply be determined. Twelve-month totals by sources are to be recorded and transmitted to the Commission in the utility’s annual report to the Commission.¹⁰

⁹ Cal. Water Code, § 520.

¹⁰ California Public Utilities Commission, General Order 103, Rules Governing Water Service Including Minimum Standards for Design and Construction (as amended March 9, 1994), § I.1.a.

3. As a matter of policy, the American Water Works Association (AWWA) recommends “that every water utility meter all water taken into its system and all water distributed from its system to its users.” AWWA policy further states that “[m]etering of all water services is an effective means of improving and maintaining the close control of water system operations necessitated by the increasing difficulty in ~~maintaining and providing obtaining~~ adequate water supplies and the increasing costs of providing water service to consumers. . . . Metering ~~also~~ provides a data-base for system performance studies, facility planning, and ~~aids in~~ the evaluation of conservation measures. It also improves accountability for water delivered through the system and, therefore, facilitates management decisions. ~~Continual and p~~Periodic performance testing, repair, and maintenance of meters ~~are~~ is an essential part of an effective universal metering program.”¹¹
4. Preparing urban water system water balances, assessing and pinpointing system water losses, and characterizing and managing system water demands require accurate measurement of source water intake, production, and distribution. Empirical evidence conclusively demonstrates the necessity of frequent flow measurement of source water intake, production, and distribution to undertake these management activities.¹²
5. Meter accuracy is a function of correct sizing and proper maintenance. Incorrectly sized and/or poorly maintained source and production meters will ~~under read water flow and~~ result in inaccurate water measurement data.¹³

Expected Impacts:

Minimal. The above definition is consistent with standard water industry practice in California. Urban water purveyors may incur some cost to conform their data collection and storage systems to relevant state water data collection guidelines and protocols.

Follow-on Considerations:

1. Should the definition include a water purveyor size threshold? The 1991 California Water Use Measurement Law (S.B. 229) exempted community water systems which serve less than 15 service connections used by yearlong residents or regularly serve less than 25 yearlong residents, or a single well which services the water supply of a single family residential home from the requirement to meter new potable water service connections.
2. Who would pay for the installation, maintenance, reading, and recording of water source meters where they do not exist?

¹¹ Adopted by the Board of Directors of the AWWA on Jan. 26, 1969, and revised on June 15, 1980, reaffirmed June 22, 2986, revised June 6,1993, and June 21, 1998, reprinted in American Water Works Association, 1982-83 Officers and Committee Directory, including Policy Statements and Official Documents.

¹² Farley, Malcom and Stuart Trow, Losses in Water Distribution Networks, IWA Publishing, 2003.

¹³ Ibid.

3. Should this water source and production measurement also include water quality measurement?

B. Urban water purveyor customer water uses

Appropriate measurement of urban water purveyor customer water uses requires the following:

- a) Use of suitable water meters at all customer connections to the water delivery system. A suitable water meter is one that is in compliance with relevant standards of the American Water Works Association and any relevant state standards and legal requirements, is of a type approved by the Director of Food and Agriculture pursuant to Section 12500.5 of the Business and Professions Code.
- b) Customer meters ~~should to~~ be read at least monthly if possible, and under no circumstances less frequently than ~~quarterly~~ bi-monthly.
- c) Customer meters ~~should to~~ be sized appropriately, well maintained, and periodically calibrated to ensure reasonable accuracy.
- d) Customer measurement data ~~should to~~ be recorded using standard measurement units and stored by the urban water purveyor using a suitable database management system. Data structures and customer classification schemes should conform to relevant state water data collection guidelines and protocols (*see Section I*).

e) Measurement data on water consumed to be forwarded to the customer for the customer's information.

* Nothing in this definition should be construed to supercede existing state and federal authority and requirements embodied in or through the federal Safe Drinking Water Act and the California Safe Drinking Water Act to impose measurement, monitoring, and reporting requirements on water quality subject to regulation under these acts.

Justification of Definition:

1. The California State Legislature has declared that, “pursuant to the primary interest of the people of the state to put the limited available supplies of water in this state to beneficial use to the fullest extent of which they are capable, and to prevent waste, unreasonable use, or unreasonable method of use, it is necessary to determine the quantities of water in use throughout the state to the maximum extent that is reasonable to do so.”¹⁴ Volumetric measurement of urban water purveyor customer water uses is a necessary action to determine the quantities of water used for domestic, municipal, and industrial purposes.
2. The California State Legislature has declared that “water furnished or used without any method of determination of the quantities of water used by the person to whom the water is furnished has caused, and will continue to cause, waste and unreasonable use of water, and that this waste and unreasonable use should be identified, isolated, and eliminated.”¹⁵ It has also declared that “waste or unreasonable use of water imposes unnecessary and wasteful consumption of energy to deliver or furnish the water, and it is necessary, therefore, to determine the quantities of water in use throughout the state to the maximum extent that it is reasonable to do so in order to reduce that energy consumption.”¹⁶

¹⁴ Cal. Water Code, § 520.

¹⁵ Cal. Water Code, § 521.

¹⁶ Cal. Water Code, § 522.

3. Since 1991, California law has required meters on all new potable water connections.¹⁷ The 1991 law does not include provisions that the meters be read, just installed. By limiting the metering requirement only to new connections, implementation of the law has resulted in dual measurement systems within some water systems. It has been suggested that this has at best complicated and at worst discouraged a unified measurement and pricing policy to isolate and eliminate waste and unreasonable use of water within these water systems, thereby thwarting the original intent of the legislation.
4. As a matter of policy, the American Water Works Association (AWWA) recommends “that every water utility meter all water taken into its system and all water distributed from its system to its users.” AWWA policy further states that “[m]etering of all water services is an effective means of improving and maintaining the close control of water system operations necessitated by the increasing difficulty in maintaining and providing ~~obtaining~~ adequate water supplies and the increasing costs of providing water service to consumers:.... ~~Charging for water service on the basis of metered consumption provides a means of assessing users equitably for water service.~~ Metering also provides a data-base for system performance studies, facility planning, and aids in the evaluation of conservation measures. It also improves accountability for water delivered through the system and, therefore, facilitates management decisions. ~~Continual and p~~Periodic testing, repair, and maintenance of meters ~~is an~~ are essential parts of an effective ~~universal~~ metering program.”¹⁸
5. Federal law enacted under the Central Valley Project Improvement Act (CVPIA) makes universal metering of urban CVP contractors a condition of CVP contract renewal. The United State Bureau of Reclamation (Bureau or USBR) deems metering of customer deliveries coupled with volumetric pricing an essential demand management practice for CVP M&I contractors. Metering coupled with volumetric pricing is the only non-exemptible Best Management Practice (BMP) required under Bureau Conservation Plan Requirements. Based on review of demands between metered and unmetered service areas, the Bureau has concluded that metering can reduce M&I demands by 20% to 25%. This level of demand reduction is consistent with findings from other empirical studies.¹⁹
6. The California Public Utilities Commission, pursuant to General Order 103, recommends all water sold by a utility be on the basis of metered volume sales.²⁰

¹⁷ This law became effective January 1, 1992.

¹⁸ Adopted by the Board of Directors of the AWWA on Jan. 26, 1969, and revised on June 15, 1980, reaffirmed June 22, 2986, revised June 6,1993, and June 21, 1998. reprinted in American Water Works Association, 1982-83 Officers and Committee Directory, including Policy Statements and Official Documents.

¹⁹ CALFED Water Use Efficiency Program Staff Work Group on Urban Water Use Measurement -- Compilation of Background Information on Current Urban Water Use Measurement Practices, Costs, and Benefits. March 31, 2003.

²⁰ California Public Utilities Commission, General Order 103, Rules Governing Water Service Including Minimum Standards for Design and Construction (as amended March 9, 1994), § I.1.a. It should be noted that under General Order 103 the Commission has discretion to waive metering requirements for a water utility under its jurisdiction.

7. Retrofitting unmetered customer connections with meters coupled with volumetric pricing is a BMP under the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). Urban water purveyors providing water service to more than 70% of the state's populace have signed the MOU. Retrofitting unmetered customer connections with meters coupled with volumetric pricing is also a BMP under the Water Forum Agreement.
8. Empirical evidence conclusively demonstrates that metered water service coupled with volumetric pricing can reduce water demand by 20% to 25% or more.²¹ These studies strongly indicate that metering customer uses discourages very low value water uses and wasteful practices.
9. Meter accuracy is a function of correct sizing and proper maintenance. Incorrectly sized and/or poorly maintained customer meters will under-read water flow and result in inaccurate water measurement data.²² Because meters tend to under-read as they age, meter maintenance programs often can pay for themselves through recovered water sales revenue.

Expected Impacts:

1. Urban water purveyors with a large number of unmetered customer connections would incur capital costs to retrofit unmetered connections. It has been estimated that statewide retrofitting of unmetered connections would cost in the neighborhood of \$250 million.²³ Some of this cost would be recouped by water purveyor customers through avoided operation and water system expansion costs due to slower growth in demand. Most urban water purveyor service areas in California, particularly in coastal areas, are already universally metered. Large pockets of unmetered customer connections, however, remain in the Central Valley and Foothill regions. Thus, impacts of the definition would not be uniformly distributed across the state's urban water purveyors, but rather concentrated within a subset of urban water purveyors located mostly in the Central Valley.
2. Urban water purveyors with a large number of unmetered customer connections would incur O&M costs to operate and maintain the new meters. For some purveyors, the O&M costs may be significant.

²¹ CALFED Water Use Efficiency Program Staff Work Group on Urban Water Use Measurement -- Compilation of Background Information on Current Urban Water Use Measurement Practices, Costs, and Benefits. March 31, 2003.

²² Ibid.

²³ CALFED Water Use Efficiency Program Staff Work Group on Urban Water Use Measurement -- Compilation of Background Information on Current Urban Water Use Measurement Practices, Costs, and Benefits. March 31, 2003.. This estimate assumed an average retrofit cost of \$600 per meter and did not account for any upgrades to the delivery network. The average cost per AF of water saved through meter retrofitting has been estimated at about \$350/AF. This estimate assumed an average retrofit cost of \$600 per meter, a 20% average reduction in demand, and a 15-year average useful life for a meter. Compared to recycling and desalination, with costs ranging from \$600 to \$1500 per AF, meter retrofitting would appear to be a cost-competitive alternative.

2.3. Water purveyors could incur costs to conform to state water data collection guidelines and protocols. Water purveyor data collection and storage systems are designed primarily for customer billing, financial accounting and water system management purposes. These systems are quite heterogeneous across urban water purveyors. Many may need to be modified to some degree to conform to state water data collection guidelines and protocols.

4. Most urban water purveyors, especially those already metering customer connections, already deliver customer water use data to their customers via their billing systems. Those urban water purveyors with large numbers of unmetered customer connections would incur a cost to retrofit their billing systems to include customer water use data.

Follow-on Considerations:

1. Should the definition include an exemption provision? If so what should be grounds for exemption? The MOU and CPUC policy include exemption provisions whereas Bureau policy excludes such provisions. The MOU has three grounds for exemption: (1) a full benefit-cost analysis demonstrates that meter retrofits would not be economically efficient; (2) a water purveyor does not have and cannot obtain funds necessary to implement the BMP; or (3) implementing a meter retrofit program would violate applicable existing law.
2. Should the definition include a water purveyor size threshold? The 1991 California Water Use Measurement Law (S.B. 229) exempted community water systems which serve less than 15 service connections used by yearlong residents or regularly serve less than 25 yearlong residents, or a single well which services the water supply of a single family residential home from the requirement to meter new potable water service connections.
3. Should implementation be phased-in? If so, over what period of time?
4. How should the proposed definition be coordinated/reconciled with existing metering mandates and agreements?
5. Should the definition recommend that volumetric pricing necessarily accompany the customer service metering being advocated?
6. How would the installation, maintenance, and reading of the required customer service meters be funded?
7. What constitutes “reasonable accuracy” for customer meters?
8. Should customer water use measurement also include landscape metering and multi-unit submetering. If so, what thresholds are appropriate? How would the necessary retrofits be funded? How would such requirements be integrated with the CPUC’s existing jurisdiction over submetering?
9. Should a definition of appropriate customer water use measurement also include water quality measurement?

C. Urban wastewater discharger wastewater collection and discharge

Appropriate measurement of urban wastewater requires the following:*

- a) Use of suitable ~~meters-measurement devices~~ at all effluent discharge points capable of measuring and recording continuous flow. Use of monitoring equipment or methods, including, where appropriate, biological monitoring and effluent sampling methods as prescribed by NPDES ~~permits~~ or Waste Discharge Requirements ~~s-permits~~.
- b) Effluent measurement data should be recorded and stored by the urban wastewater discharger using a suitable database management system. Data structures and classification schemes should conform to relevant permit/~~WDR~~ requirements as well as state water data collection guidelines and protocols.

* Nothing in this definition should be construed to supercede existing state and federal authority and requirements embodied in ~~or through~~ the federal Clean Water Act and state Porter-Cologne Water Quality Control Act to impose measurement, monitoring, and reporting requirements on wastewater discharges subject to regulation under these acts.

Justification of Definition:

1. Measurement of ~~point-source~~ discharges consistent with the above definition is necessary to implement, monitor, and enforce compliance with various provisions of the federal Clean Water Act (CWA) and state Porter-Cologne Water Quality Control Act.
 - a. The California Porter-Cologne Water Quality Control Act applies to both surface and groundwaters and to both point and nonpoint sources. More narrowly, the federal CWA establishes a program to regulate point source discharges to surface waters under the National Pollutant Discharge Elimination System (NPDES). Discharges that are not subject to the CWA but that nonetheless have the potential to affect the quality of the waters of the state remain subject to regulation under the state's Porter-Cologne Water Quality Control Act, which was enacted earlier and is broader in scope than the federal CWA.
 - b. Under the Porter-Cologne Water Quality Control Act, the state regulates, in part, by requiring that persons proposing to discharge first obtain Waste Discharge Requirements (WDRs) from the state. U.S. EPA ~~administers has delegated~~ the NPDES program ~~but has authorized to~~ the State of California to implement ~~based on findings that~~ the Porter-Cologne Water Quality Control Act ~~is sufficiently equivalent to in lieu of~~ the federal ~~program~~ Clean Water Act. Accordingly, state-issued WDRs also serve as federal ~~CWA-NPDES~~ permits for ~~surface water~~ discharges ~~regulated under the NPDES program~~. [The terms "waste discharge requirements" and "NPDES permits" are often used interchangeably when they cover surface point sources.²⁴] WDRs ~~and NPDES permits~~ are issued and enforced by the Regional Water Quality Control Boards and, ~~when necessary~~, are further enforced by the State Water Resources Control Board.

²⁴ Cal. Water Code, § 13374.

- c. Issued ~~in five-year~~for varying durations, ~~terms,~~ WDRs and NPDES permits contain monitoring and reporting provisions necessary to evaluate permit discharger compliance. Monitoring requirements generally include daily effluent flow measurement from the permitted facility along with a variety of water quality monitoring requirements specific to the effluent discharge of the facility and the water quality status of the receiving water body. ~~POTWs and other p~~Permitted dischargers generally submit monthly reports to their Regional Board on daily flow and various water quality parameters.
2. Quantification of ~~point source~~ discharges will facilitate estimation of urban water uses for statewide and regional planning.
3. Quantification of ~~point source~~ discharges and water quality assessments will also facilitate estimation of urban water recycling potential for statewide and regional planning.
4. Currently, state water planners do not have a good understanding of water withdrawal and consumption by self-supplied large industrial water users. Quantification of ~~point source wastewater~~ discharges from self-supplied industrial water users (where they have a separate discharge permit), coupled with information about facility water uses and processes, should will further facilitate estimation of urban uses for statewide and regional planning.
5. Measurement of effluent flow can by and large serve as a surrogate for influent flow into wastewater discharger facilities, given that the approximate volume of materials being extracted during the treatment process is known.

Expected Impacts:

Negligible. The above definition is consistent with standard wastewater industry practice in California. Urban wastewater dischargers may incur some cost to conform their data collection and storage systems to relevant state water data collection guidelines and protocols. However, the state and federal governments are already proceeding with development of a statewide NPDES ~~and WDR~~ reporting system and will start transitioning NPDES ~~and WDR~~ permit holders to this system in 2004 or 2005. Use of this system for non-NPDES WDRs will follow. Thus, the proposed definition does not represent a change in current or planned measurement and reporting of urban ~~point source wastewater~~ discharges.

Follow-on Considerations:

1. Should urban wastewater dischargers also be required to collect influent data (i.e., volume coming into the treatment facilities)? ~~Most WDRs permits~~ already require reporting of influent monitoring (e.g., of flow, water quality parameters) if it is being monitored by the discharger.²⁵ DWR has expressed an interest, in

²⁵ Personal Communication with State Water Resources Control Board.

particular, in obtaining influent data from industrial facilities that receive water from private providers drawing largely on groundwater.

D. Net Groundwater Use

Appropriate measurement of groundwater includes a focus on net groundwater use²⁶ and requires the following:

- a. Continuous regional characterization of groundwater volume using two methods simultaneously: (1) development of detailed sub-basin hydrologic balances; and (2) the water table/specific yield method.

Justification of Definition:

1. The California State Legislature has declared that, “pursuant to the primary interest of the people of the state to put the limited available supplies of water in this state to beneficial use to the fullest extent of which they are capable, and to prevent waste, unreasonable use, or unreasonable method of use, it is necessary to determine the quantities of water in use throughout the state to the maximum extent that is reasonable to do so.”²⁷ Volumetric measurement of groundwater is a necessary and reasonable action to help facilitate local, state and federal agency water management and planning. This approach represents an improvement in the consistency of the analytic rigor with which the groundwater resources of the state are assessed, and will serve to improve understanding of amounts used and the extent of overdraft.
2. Where there is a proposal for a water transfer or a project converting land from an agricultural to an urban use (e.g., to a residential development exceeding 500 units), regions that have been measured consistent with the above definition will have improved data available in order to evaluate whether a factual basis exists to support legally required agency findings of fact.
3. Currently, state water planners do not have a good understanding of water withdrawal and consumption by self-supplied industrial, commercial, and residential water users. Measurement of groundwater consistent with the above definition should facilitate estimation of water uses for statewide and regional planning.

Expected Impacts:

1. The expected impacts to water users are likely to be minimal. The proposed method of continuous regional characterization will mean higher state planning costs: roughly \$2 million additional per year. Where continuous measurement of well discharge is required in the case of a water transfer, opportunities may exist for costs to be internalized into the transaction costs borne by the participants to the transfer.

²⁶ In the Final Report of the Independent Panel on Appropriate Measurement of Agricultural Water Use convened by the California Bay-Delta Authority, the Panel concluded that, for the purposes of state and federal water management and planning, it was more appropriate to measure net groundwater use rather than gross groundwater extraction. The Panel did go on to note that in cases of groundwater substitution transfers, appropriate measurement requires continuous measurement (via totalizing flow or power meters), monitoring, and frequent reporting of the groundwater wells involved.

²⁷ Cal. Water Code, § 520.

Follow-on Considerations:

1. Incremental cost estimates will need to be confirmed. How will this affect the cost analysis?
2. Benefits from this action will be fully realized only if coupled with improved measurement of surface water diversions and crop water consumption. How will this be assured?
3. Because net groundwater use is calculated as a closure term under this approach, it may not always allow for urban and agricultural net groundwater uses to be distinguished. How does this limit the value of this information?

III. Reporting of Urban Water Uses

A. Urban water purveyor reporting to State of California

Appropriate measurement of urban water uses requires urban water purveyors report annually the following to the State of California:*

- a) An estimate of service area population that conforms to state water data collection guidelines and protocols
- b) The number of metered and unmetered customer connections subtotaled by customer class definitions conforming to state water data collection guidelines and protocols.
- c) Water production by month subtotaled by water source definitions conforming to state water data collection guidelines and protocols.
- d) Annual water deliveries subtotaled by customer class definitions conforming to state water data collection guidelines and protocols.
- e) Monthly, ~~or~~ bi-monthly, ~~or quarterly~~ water deliveries, according to meter read frequency, subtotaled by customer class definitions conforming to state water data collection guidelines and protocols.
- f) Water service rates, rate structures, and charges in effect for report year.

* Nothing in this definition should be construed to supercede existing state and federal authority and requirements embodied in or through the federal Safe Drinking Water Act and the California Safe Drinking Water Act to impose measurement, monitoring, and reporting requirements on water quality subject to regulation under these acts.

Justification of Definition:

1. The California State Legislature has declared that, “pursuant to the primary interest of the people of the state to put the limited available supplies of water in this state to beneficial use to the fullest extent of which they are capable, and to prevent waste, unreasonable use, or unreasonable method of use, it is necessary to determine the quantities of water in use throughout the state to the maximum extent that is reasonable to do so.”²⁸
2. The California State Legislature has declared that “the people of the state have a primary interest in the orderly and coordinated control, protection, conservation, development, and utilization of the water resources of the state by all individuals and entities and that it is the policy of the state that The California Water Plan, with any necessary amendments, supplements, and additions to the plan, is accepted as the master plan which guides the orderly and coordinated control, protection, conservation, development, management and efficient utilization of the water resources of the state.”²⁹
3. It is the responsibility of the Department of Water Resources to “plan for the orderly and coordinated control, protection, conservation, development, and utilization of the water resources of the state ... “ and to update this plan – The California Water Plan -- “on or before December 31, 2003, and every five years

²⁸ Cal. Water Code, § 520.

²⁹ Cal. Water Code, § 10005.

thereafter.”³⁰ The Department of Water Resource is required by law to release assumptions and other estimates used for the California Water Plan, including, but not limited to, the following:

- a. Current and projected population
 - b. Current and projected water use for all of the following:
 - Interior uses in a single-family dwelling.
 - Exterior uses in a single-family dwelling.
 - All uses in a multifamily dwelling.
 - Commercial uses.
 - Industrial uses.
 - Parks and open spaces.³¹
4. The Department of Water Resources administers annually a survey of about 700 urban water purveyors to collect the data listed in the proposed definition.³² The Department has indicated that the present approach suffers from the following ~~defects~~shortcomings:
- a. Individual surveys are frequently incomplete or improperly filled out. Unmetered service areas in particular are unable to provide data on deliveries to different customer classes or must estimate these deliveries.
 - b. About 50% of responses don't report water deliveries by customer class either because they don't maintain records on water use by customer class or because their customer classes don't match the survey's categories. As an example, many systems classify multi-family residential water use as commercial whereas the production survey provides a separate category for this use. Guidelines and protocols for classifying urban water users are needed to provide state planners with consistent and comparable data on urban water uses.
 - c. DWR considers the population estimates provided by survey respondents to be unreliable. Experience suggests that many (perhaps most) urban water suppliers do not provide reliable estimates of the total population served by their system. Thus per capita use estimates derived from the data can be inaccurate. Guidelines and protocols for estimating service area population are needed to provide state planners with reliable population estimates.
 - d. The survey does not always provide good geographic representation of urban water uses. In particular, the survey frequently under-samples less densely populated areas. More comprehensive data collection is required to provide adequate representation statewide.

³⁰ Cal. Water Code, § 10004.

³¹ Ibid.

³² One exception is information about water rates and charges, which is currently not part of the survey. Department staff has indicated that information about water rates and charges is needed to make projections of future water demands by customer class for the California Water Plan.

- e. The survey does not collect water use information for self-supplied residential, commercial, or industrial water users. Because many of these users are in rural areas this compounds the problems associated with under-sampling discussed previously.
 - f. The survey currently does not collect information about water rates or costs. The Department requires information about rates and cost trends to forecast how costs are changing and how this might affect water demand.
5. The proposed definition will provide the Department of Water Resources with more comprehensive and accurate data on urban water uses needed for statewide water planning.
 6. Data that would be collected and reported under this definition is needed by urban water purveyors subject to regional and urban water management planning requirements under state water code sections 10530 – 10546 and 10610 – 10657.

Expected Impacts:

1. Reporting requirements for some urban water purveyors will increase. Not all urban water purveyors participate in DWR's current survey.
2. Urban water purveyors may incur costs to conform their data collection and reporting system to state water data collection guidelines and protocols.

Follow-on Considerations:

1. Should the definition include a water purveyor size threshold? The 1991 California Water Use Measurement Law (S.B. 229) exempted community water systems which serve less than 15 service connections used by yearlong residents or regularly serve less than 25 yearlong residents, or a single well which services the water supply of a single family residential home from the requirement to meter new potable water service connections. Likewise small water systems are exempted from Urban Water Management Planning Act requirements. In addressing this consideration it should be remembered that one of the limitations to the Department's current approach is that it does not collect water use information for self-supplied residential, commercial, or industrial water users.
2. The proposed definition would not collect information on water quality characteristics of urban water uses. Is this adequate?
3. Are there ways to combine existing **planning and** data reporting processes (e.g. DWR, DHS, USBR, CUWCC) to minimize reporting overlap?
4. Are there compatibility issues between the urban water purveyor reporting requirements recommended in this document and the reporting provisions required by other existing planning processes (e.g., DWR, USBR, CUWCC, DHS)?

B. Urban wastewater discharger reporting to State of California

Appropriate measurement of urban water uses requires urban wastewater ~~purveyors~~ dischargers report at least annually the following to the State of California:*

- a) Conditions and limits of discharge specified in relevant NPDES or WDR permits.
- b) Volume of effluent from each discharge location.
- c) Effluent discharge and receiving water body quality measurements as specified by the relevant NPDES permit or WDR ~~s~~ permits.

*Nothing in this definition should be construed to supercede existing state and federal authority or requirements embodied in or through the federal Clean Water Act and state Porter-Cologne Water Quality Control Act to impose measurement, monitoring, and reporting requirements on wastewater discharges subject to regulation under these acts.

Justification of Definition:

1. Water Code section 13166 requires the State Water Resources Control Board, with the assistance of the Regional Boards, “to prepare and implement a statewide water quality information storage and retrieval program. Such program shall be coordinated and integrated to the maximum extent practicable with data storage and retrieval programs of other agencies.”
2. State compilation of NPDES permit information is needed to fulfill the state’s NPDES permit reporting obligations under Title 33, Chapter 26, Subchapter IV of the US Federal Code.
3. Compilation of ~~point source~~ wastewater discharge data will facilitate estimation of urban water uses for statewide and regional planning. Currently the Regional Boards in a variety of ways house data on permitted ~~point source~~ discharges. Mostly this data is collected and filed using paper-based reporting systems. Little of this information is currently stored in electronic format, rendering much of it inaccessible from a practical standpoint. State data warehousing would enable currently collected data on wastewater discharges to be used for a variety of regional, state, and federal water management purposes, including, but not limited to: (1) monitoring, reporting, and enforcement responsibilities specified by CWA and Porter-Cologne Act; (2) State Water Plan updates; and (3) regional and state recycled water planning.
4. Currently, state water planners do not have good understanding of water withdrawal and consumption by privately- or self-supplied large industrial water users, especially when the source is groundwater. Quantification of wastewater point source discharges from self-supplied industrial water users (where they have a separate discharge permit), coupled with information about facility water uses and processes, ~~should~~ will further facilitate estimation of urban uses for statewide and regional planning. While discharge data from these permitted facilities is collected by the Regional Boards it is not centrally stored or accessible. State data warehousing would allow access to this data.

Expected Impacts:

Minimal. The state and federal governments are already proceeding with development of a statewide NPDES ~~and WDR~~ reporting system and will start transitioning NPDES ~~and WDR~~ permit holders to this system in 2004 or 2005. Use of this system for non-NPDES WDRs will follow. Thus the proposed definition does not represent a change in planned measurement and reporting of urban point source discharges.

Follow-on Considerations:

1. Should urban wastewater dischargers also be required to collect influent data (i.e., volume coming into the treatment facilities)? Most WDR permits already require influent monitoring (e.g., of flow, water quality parameters).³³ DWR has expressed an interest, in particular, in obtaining influent data from industrial facilities that receive water from private providers drawing largely on groundwater.

³³ Personal Communication with State Water Resources Control Board.

IV. Urban water use research program

Appropriate measurement of urban water uses requires the state to implement and sustain an urban water use research program that includes, but would not be limited to, the following:

- a) Residential, commercial, and industrial water end use studies
- b) Measurement of urban landscape areas and associated water uses
- c) Urban land use changes and associated changes in water uses
- d) Efficacy of alternative urban water use forecasting methods
- e) Economic studies addressing:
 - Value of water in alternative urban uses
 - Household water use decision-making
 - Commercial and industrial water use decision-making
 - Water demand reduction potential of emerging conservation technologies and programs
- f) Sub-metering in multi-family dwellings
- g) Self-supplied groundwater use (including the breakdown between urban and ag)

Justification of Definition:

1. Improving the state's ability to forecast and plan for future urban water demands requires a fuller understanding of how water is used in urban areas and how this use is changing over time due to changes in land use patterns, demographics, technology, and economics.
2. A frequent criticism of previous State Water Plan Updates is the use of very general and simplified assumptions to predict future urban water demand. A robust and sustained research program could provide the Department of Water Resources with tools (e.g. a statewide urban GIS of urban land and water uses) and information (e.g. value of water in alternative urban uses) that would substantially improve its ability to make regional urban water use forecasts.
3. A fuller understanding of how water is used in urban areas would support regional water management planning activities authorized under California Water Code sections 10530 through 10546 (Integrated Regional Water Management Plans) and 10610 through 10657 (Urban Water Management Plans).

Expected Impacts:

1. State and/or urban water purveyors and wastewater dischargers would incur cost to fund research program.

Follow-on Considerations:

1. Who would administer the research program? Should it be housed within a university, research institute, or state agency?

2. How would such a program be funded? Would water user fees be an appropriate source of funding? What would be an appropriate cost share between federal, state, and local entities?
3. How would the results of this research be disseminated to local water suppliers and wastewater dischargers?

ATTACHMENT 1

Participants – June 3, 2002 Urban Water Measurement “Brainstorming” Session

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Follow up interviews – Urban Water Use Measurement Experts

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